PATENT ABSTRACTS OF JAPAN

(11)Publication number :   **2001-121888**

(43)Date of publication of application : **08.05.2001**

(51)Int.Cl.	**B43M 3/04**
	B07C 3/14
	G06T 1/00

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(54) **CARRYING DEVICE FOR IMAGE RECOGNITION AND ENVELOPE SEALING SYSTEM USING THE DEVICE**

(57)Abstract:

PROBLEM TO BE SOLVED: To improve the image recognition accuracy by a simple structure and also improve the working efficiency in a working process for a carrying device for image recognition for holding and carrying a body to be carried and an envelope sealing system thereof when an image of a recognition mark attached to the body to be carried is picked up and recognized.

SOLUTION: A face on which recognition marks are formed on a body 16 to be carried is positioned to be adequately brought into contact with an image pickup camera 12 by a carrying means having a carrying belt 14A hung annularly on two carrying rollers 13A and a carrying belt 14B hung annularly on two carrying rollers 13B under the image pickup camera, and the back of the body 16 to be carried is help by movable holding sections 15-1 and 15-2 disposed under the body to be carried.
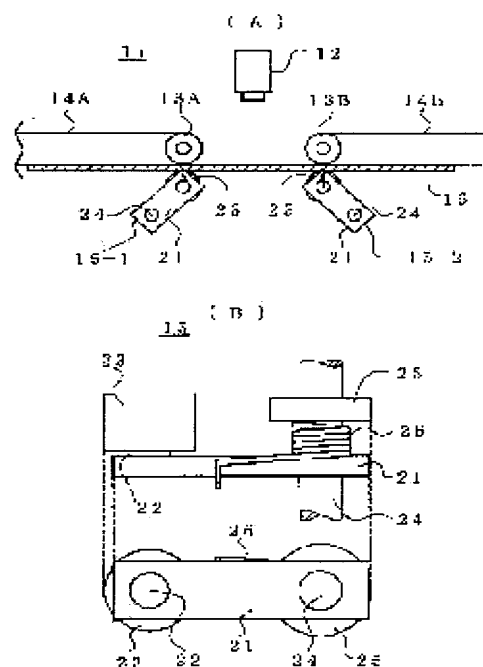
* NOTICES *

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2.**** shows the word which can not be translated.
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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]When this invention makes the identification signal given to the transportation body picturize and recognize, it relates to the conveying machine for image recognition and envelope enclosing system which make a transportation body hold and convey.
[0002]
[Description of the Prior Art]In recent years, making a character, a sign, an object, and others recognize by processing image recognition using a computer is performed briskly industry, physical distribution relations, etc. Although these processing image recognition has various methods according to the purpose, improvement in recognition precision is desired generally.
Recognition precision is wanted to improve irrespective of the recognition object object to which especially a character, a sign, etc. were given.

[0003]The key map of the image recognition in the conventional conveying machine for image recognition is shown in drawing 4. In drawing 4 (A), the imaging camera 101 which contained CCD is arranged and the transportation belt 102 of a conveyer style is arranged at the lower part. On the other hand, the transportation body 103A to which the mark for image recognition was given is conveyed with the above-mentioned transportation belt 102. When this transportation body 103A is conveyed on the transportation belt 102 and it is located under the above-mentioned imaging camera 101, the imaging camera 101 concerned picturizes the mark given to the transportation body 103A. Imaging data is processed by the processing-image-recognition means etc. which are not illustrated, and the mark concerned is recognized.
[0004]For example, the conveying machine for described image recognition is applied to the envelope enclosing system which is made to enclose a predetermined enclosure thing with an envelope, and is made to deliver. In this case, the seal with which the mark of the object of different described image recognition for every envelope was printed, or the mark concerned was printed is stuck on an envelope, and it is going to check and manage the relation between an identification signal and the envelope concerned by carrying out the image recognition of these marks.
[0005]
[Problem(s) to be Solved by the Invention]By the way, that from which thickness differs depending on the transportation body 103A may be applicable. When making an enclosure thing enclose with the above-mentioned envelope, thickness changes with the contents and quantity of the enclosure thing. Namely, although the distance from the field (upper surface) where the mark of the transportation body 103A concerned was attached in the case of the transportation body 103A shown in drawing 4 (A) to the imaging camera 101 is H1, it receives, In the case of the transportation body 103B from which the thickness shown in drawing 4 (B) differs, the distance from the upper surface to the imaging camera 101 is set to H2.
[0006]Therefore, if image recognition is picturized and carried out in the state where focuses will differ

by the above-mentioned transportation body 103A and the transportation body 103B when the position of the imaging camera 101 is being fixed, and a focus does not suit, There is a problem that recognition precision falls and there is a problem that the frequency where a series of processes are stopped increases, and operation efficiency falls according to erroneous recognition. When you are going to make it cope with any transportation body of thickness, it is necessary using infrared rays etc. to form the mechanism which makes an automatic focusing function provide or to which the height of the imaging camera 101 concerned is made to adjust for the imaging camera 101, and becomes expensive, and there is a problem that a mechanism becomes complicated.

[0007]Then, it aims at providing the conveying machine for image recognition and envelope enclosing system where this invention was made in view of the aforementioned problem, and raises image recognition accuracy by a simple mechanism and which raise the operation efficiency of a process of operation by extension.

[0008]

[Means for Solving the Problem]In order to solve an aforementioned problem, in an invention of claim 1. In a conveying machine for image recognition for conveying a transportation body to which a predetermined identification signal was given, and making the identification signal concerned picturize and recognize by an imaging means, A transportation means which conveys the transportation body concerned in contact with a field where said identification signal of said transportation body which counters said imaging means was attached, It has composition which has the holding mechanism of a predetermined number which contacts free movable and is held to an opposite side of a thickness direction of a field where said identification signal in a transportation body conveyed by said transportation means was attached. Said holding mechanism is provided with an energizing means which a thickness direction is made to energize to said transportation body in an invention of claim 2.

[0009]An enclosure thing feeding means which supplies an enclosure thing of a predetermined number enclosed with an envelope as a transportation body to which it is an envelope enclosing system provided with the conveying machine for image recognition according to claim 1 or 2, and said identification signal was given in an invention of claim 3, It has composition which has an enclosure means with which said enclosure thing supplied to said envelope from said enclosure thing feeding means is made to enclose, an imaging means which picturizes an identification signal given to said envelope, and a management tool which checks and manages correlation with said envelope and said enclosure thing based on imaging data from said imaging means. In an invention of claim 4, it has identification signal means forming which gives said identification signal to said envelope.

[0010]Thus, in a conveying machine for image recognition, a transportation means conveys in contact with a field where the identification signal concerned was attached to a transportation body to which an identification signal was given, and it holds free movable by an energizing means suitably in contact with an opposite side of a thickness direction of a field where the identification signal concerned was attached in holding mechanism at the time of conveyance. Therefore, image pick-up distance to an imaging means becomes fixed irrespective of thickness of a transportation body, It becomes possible to raise accuracy of image recognition of the identification signal concerned simply, without carrying out focusing and distance regulation according to thickness of the transportation body concerned, and it becomes possible to prevent an operation stop by erroneous recognition and to raise operation efficiency.

[0011]In an envelope enclosing system using a conveying machine for described image recognition, It is a thing which makes an enclosure thing of a predetermined number supplied from an enclosure thing feeding means enclose with an envelope as a transportation body to which an identification signal was given by an enclosure means, An imaging means picturizes an identification signal suitably given to the envelope concerned of thickness according to an enclosure thing by identification signal means forming, it is recognized, and a management tool checks and manages correlation with an identification signal and the envelope concerned. Therefore, image pick-up distance to an imaging means becomes fixed irrespective of thickness of an envelope, It becomes possible to raise accuracy of image recognition of the identification signal concerned simply, without carrying out focusing and distance regulation

according to thickness of the envelope concerned, and it becomes possible to prevent an operation stop by erroneous recognition and to raise system operation efficiency.

[0012]

[Embodiment of the Invention]Hereafter, a figure explains the desirable embodiment of this invention. The lineblock diagram of the conveyance maintaining structure in the conveying machine for image recognition of this invention is shown in drawing 1. Drawing 1 (A) shows the conveyance maintaining structure which is a main part in the conveying machine for image recognition of this invention, and drawing 1 (B) is also that holding mechanism was shown. The conveyance maintaining structure 11 shown in drawing 1 (A) is that by which the imaging camera 12 provided with CCD, for example is arranged, The transportation belt 14A in which the imaging camera 12 concerned was caudad hung annularly by the two transportation rollers 13A (provided also in the position which is not illustrated, and which counters), and the transportation belt 14B annularly hung by the two transportation rollers 13B (provided also in the position which is not illustrated, and which counters) are arranged. These transportation rollers 13A and 13B and the transportation belts 14A and 14B constitute a transportation means.

[0013]Under the above-mentioned transportation means, the movable attaching part 15 (15-1,15-2) which is the holding mechanism of a predetermined number is arranged, and the transportation body 16A to which the predetermined identification signal was given between the transportation means concerned and the movable attaching part 15 (15-1,15-2) is conveyed. In this case, the transportation rollers 13A and 13B of the above-mentioned transportation means and the transportation belts 14A and 14B comprise width (or width beyond it) of the cross direction (from a drawing top and this side to the direction of the back) of the transportation body 16A, for example. The transportation means concerned may be arranged with the desired number crosswise [of the transportation body 16A]. Although the above-mentioned movable attaching part 15 (15-1,15-2) is arranged to two near sides, for example on a drawing in the cross direction of the transportation body 16A and it is arranged at two back sides, the arrangement number is set up suitably.

[0014]The axis 22 is attached to the end portion of the movable plate 21, and the movable attaching part 15 (15-1,15-2) is supported pivotally by the axis 22 concerned, enabling free rotation of the rotary roller 23, as shown in drawing 1 (B). The axis of rotation 24 is supported relatively to the movable plate 21 concerned pivotally by the other end portion of the movable plate 21, enabling free rotation, and the belt pulley 25 adheres to the predetermined part of the axis of rotation 24 concerned. And the coil spring 26 which is an energizing means as twisted around the axis of rotation 24 between the movable plate 21 and the belt pulley 25 is formed. One end of this coil spring 26 is fixed to the belt pulley 25, and the other end is hung on the flank of the movable plate 21.

[0015]Such a movable attaching part 15 is that by which the axis of rotation 24 is fixed to device casing etc., Rotation of the movable plate 21 (rotary roller 23) is attained centering on the axis of rotation 24 concerned, and as the coil spring 26 shows the rotary roller 23 to drawing 1 (A), energizing force works up (transportation body 16A side). If conveyance in the part which does not perform the image pick-up by the imaging camera 12 is made to convey in the state where it laid on the transportation belt concerned by a transportation means like the above-mentioned transportation belts 14A and 14B, it is sufficient for it.

[0016]That is, the transportation rollers 13A and 13B of a transportation means and the transportation belts 14A and 14B convey a transportation body in contact with the field where the identification signal of the transportation body 16A which counters the imaging camera 12 was attached. The rotary roller 23 made to energize free movable to the opposite side of the thickness direction of the field where the identification signal in the transportation body 16A conveyed by the above-mentioned transportation means was attached contacts, and the movable attaching part 15 (15-1,15-2) is held.

[0017]Although the above-mentioned composition showed the case where the coil spring 26 was used as an energizing means, it may not restrict to this and elastic members, such as a flat spring and rubber, may be used. Although the above-mentioned composition showed the case where the transportation body 16A was conveyed horizontally, when making it convey perpendicularly, it should just carry out

arrangement which rotated each component part shown in drawing 1 (A) 90 degrees.

[0018]Then, the figure for explaining operation of the conveyance maintaining structure of drawing 1 is shown in drawing 2. As shown in drawing 2 (A), the field 16-1 where the identification signal which does not illustrate the transportation body 16A was attached is contacted by the transportation belts 14A and 14B, And it is held and conveyed, being energized at the transportation belt 14A andB [14] side by the opposite side 16-2 being contacted by the movable attaching part 15 (15-1,15-2). And when located under the imaging camera 12, the identification signal attached by the imaging camera 12 concerned is picturized. At this time, the distance of the field 16-1 and the imaging camera 12 to which the identification signal was given is picturized by H0.

[0019]On the other hand, as shown in drawing 2 (B), when the transportation body 16B with thick thickness is conveyed from the above-mentioned transportation body 16A, It rotates also energizing the rotary roller 23 to the transportation belt 14A andB [14] side in contact with the field 16-2 of the transportation body 16B concerned because the movable plate 21 rotates to a thickness direction centering on the axis of rotation 24 according to the thickness of the transportation body 16B concerned in the movable attaching part 15 (15-1,15-2). At this time, the position of the field 16-1 where the identification signal of the transportation body 16B was attached is in the state fixed with the transportation belts 14A and 14B, and the distance of the field 16-1 concerned and the imaging camera 12 in the case of being located under the imaging camera 12 and picturized is set to H0.

[0020]That is, the field 16-1 where the identification signal was attached becomes always constant [the distance H0] to the imaging camera 12 irrespective of the thickness of the transportation bodies 16A and 16B. If this sets up as a fixed focus which set the focus of the imaging camera 12 constant, the always stable picture can be picturized, and the accuracy of the image recognition performed based on this imaging data improves. The erroneous recognition of a picture (identification signal) decreases, the stop of a series of processes accompanying erroneous recognition is prevented, and this can raise operation efficiency. And compared with the case where what is necessary is just to form the above-mentioned movable attaching part 15 (15-1,15-2), and the mechanism of automatic focusing and the mechanism of the height adjustment of the imaging camera 12 are formed, it is cheaply and simply realizable.

[0021]Next, the schematic diagram of the envelope enclosing system with which the conveying machine for image recognition of this invention is applied is shown in drawing 3. The envelope enclosing system 31 shown in drawing 3 is what encloses a throwaway with an envelope and gives an identification signal to the envelope concerned, The throwaway feed zone 33 which supplies the throwaway 32 of a predetermined number is allocated, and the envelope enclosing device 35 which encloses the throwaway 32 with the conveying machine 34 and envelope which convey the throwaway 32 and the below-mentioned envelope is allocated. The envelope enclosing device 35 is provided with the transportation means (not shown) which is provided with the envelope feed zone 37 which supplies the envelope 36, and conveys the supplied envelope 36 to an enclosing position. It has the thickness sensors 38, such as a reflection type which detects the thickness at the time of enclosure.

[0022]On the other hand, the label attachment part 40 as identification signal means forming which sticks the label 39 to which the identification signal was beforehand given by printing etc. is allocated the envelope enclosing device 35, the conveying machine 34, and in between, The conveying machine for image recognition (it does not appear in a figure) which equips the final stage floor part of the conveying machine 34 with the above-mentioned conveyance maintaining structure 11 is allocated, and the above-mentioned imaging camera 12 which is an imaging means up is arranged. And the stacker 41 which stocks the envelope 36 in which the throwaway 32 was enclosed one by one is allocated. 42 is the management computer 42 which is a management tool which controls an envelope enclosure process. It may change to the label attachment part 40, and the means which carries out printing print of the identification signal to the envelope 36 concerned directly may be formed.

[0023]The throwaway 32 of a predetermined number is supplied to the conveying machine 34 one by one from the throwaway feed zone 33, these are piled up, and the above-mentioned envelope enclosing device 31 is conveyed to an enclosing position. On the other hand, in the envelope enclosing device 35,

the envelope 36 is supplied from the envelope feed zone 37, and it conveys to an enclosing position. It is detected whether the throwaway 32 of the predetermined number was enclosed in this position, and the enclosure thing was enclosed by the thickness sensor 38. And the envelope 36 in which the throwaway 32 of the predetermined number was enclosed is closed, is conveyed to the position of the label attachment part 40, and in the label attachment part 40, the label 39 is stuck and it is reversed there.

[0024]Although the envelope 36 as the transportation body 16 in which the label 39 was stuck is conveyed to the downward position of the imaging camera 12, it is held from just before the position concerned by the above-mentioned conveyance maintaining structure 11 of the conveying machine for image recognition, and the stuck label 39 is turned upward and the lower part of the above-mentioned imaging camera 12 is passed. At this time, picturize the label 39 concerned with the imaging camera 12, and the imaging data of an identification signal (for example, number) is sent out to the management computer 42, The identification signal concerned and the envelope 36 concerned are associated by recognizing with the management computer 42 concerned, and management of the delivery in this envelope 36, etc. are performed. And the envelope 36 (transportation body 16) concerned in which the image pick-up of the label 39 was performed is stocked one by one by the stacker 41.

[0025]Thus, in the above-mentioned envelope enclosing system 31, Irrespective of the thickness of the envelope 36, the image pick-up distance to the imaging camera 12 can become fixed, the accuracy of the image recognition of the identification signal concerned can be raised simply, the system operation stop by erroneous recognition is prevented, and system operation efficiency can be raised.

[0026]Although the case where it applied to an envelope enclosing system as shows drawing 3 the conveying machine for image recognition provided with the above-mentioned conveyance maintaining structure 11 was shown, The identification signal attached on the transportation body 16 which thickness changes about can be applied to all the devices which picturize with an imaging camera and are recognized, and systems, the image recognition accuracy of an identification signal can be raised, and operation efficiency can be raised.

[0027]
[Effect of the Invention]As mentioned above, according to the invention of claims 1 and 2, the transportation body to which the identification signal was given is received, By a transportation means's conveying in contact with the field where the identification signal concerned was attached, and making it hold free movable by an energizing means suitably in contact with the opposite side of the thickness direction of the field where the identification signal concerned was attached in holding mechanism at the time of conveyance, Irrespective of the thickness of a transportation body, the image pick-up distance to an imaging means can become fixed, the accuracy of the image recognition of the identification signal concerned can be raised simply, and operation efficiency can be raised.

[0028]According to the invention of claims 3 and 4, in the envelope as a transportation body to which the identification signal was given. An imaging means picturizes the identification signal which made enclose the enclosure thing of the predetermined number from an enclosure thing feeding means by an enclosure means, and was suitably given to the envelope concerned of the thickness according to an enclosure thing by identification signal means forming, and it is recognized, When a management tool checks and manages correlation with an identification signal and the envelope concerned, irrespective of the thickness of an envelope, the image pick-up distance to an imaging means can become fixed, the accuracy of the image recognition of the identification signal concerned can be raised simply, and system operation efficiency can be raised.

[Translation done.]

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CLAIMS

[Claim(s)]
[Claim 1]A conveying machine for image recognition characterized by comprising the following for conveying a transportation body to which a predetermined identification signal was given, and making the identification signal concerned picturize and recognize by an imaging means.
A transportation means which conveys the transportation body concerned in contact with a field where said identification signal of said transportation body which counters said imaging means was attached.
Holding mechanism of a predetermined number which contacts free movable and is held to an opposite side of a thickness direction of a field where said identification signal in a transportation body conveyed   _
by said transportation means was attached.

[Claim 2]A conveying machine for image recognition which is the conveying machine for image recognition according to claim 1, and is characterized by providing said holding mechanism with an energizing means which a thickness direction is made to energize to said transportation body.
[Claim 3]An envelope enclosing system comprising provided with the conveying machine for image recognition according to claim 1 or 2:
An enclosure thing feeding means which supplies an enclosure thing of a predetermined number enclosed with an envelope as a transportation body to which said identification signal was given.
An enclosure means with which said enclosure thing supplied to said envelope from said enclosure thing feeding means is made to enclose.
An imaging means which picturizes an identification signal given to said envelope.
A management tool which checks and manages correlation with said envelope and said enclosure thing based on imaging data from said imaging means.

[Claim 4]An envelope enclosing system provided with identification signal means forming which is the envelope enclosing system according to claim 3, and gives said identification signal to said envelope.

[Translation done.]

Description
Paragraph [0016]

In other word, the carrying rollers 13A, 13B and the carrying belts 14A, 14B abut to the surface of the carrying body 16A on which an identification mark is added and which faces the image pickup camera 12, to thereby carry the carrying body. Further, the rotational roller 23 movably biases against the surface of the carrying body 16A which is opposite to the surface on which the identification marks is added in the width direction, abuts the movable holding sections 15 (15-1, 15-2) so as to hold the movable holding sections 15.

Paragraph [0017]

Note that in the configuration described above, the coil spring 26 is used as a bias means. But the present invention is not limited thereto. An elastic member such as a leaf spring or rubber can be used. Further, in the configuration described above, the carrying body 16A is carried in a horizontal direction. However, in a case the carrying body 16A is carried in a vertical direction, a configuration in which the configuration shown in Fig. 1(A) is rotated by 90 degrees can be used.

Brief explanation of drawings

Fig. 1 shows a configuration of carrying holding mechanism of the carrying apparatus for image recognition of the present invention.

Fig. 2 shows an explanatory view for explaining the operation of the carrying holding mechanism shown in Fig. 1.

Fig. 3 illustrates a schematic diagram of the envelope enclosing system to which the carrying apparatus for image recognition of the present invention is applied.

Fig. 4 shows a concept view of the image recognition in the conventional carrying apparatus for the image recognition.

Reference numerals

11: carrying holding mechanism
12: image pickup camera
13A, 13B: two carrying rollers
14A, 14B: carrying belt
15-1, 15-2: movable holding sections
16A, 16B: body
21: movable plate
23: rotational roller
26: coil spring
31: envelope enclosing system
32: papers
36: envelope
39: label
41: stacker

| (51)Int.Cl.⁷	識別記号	FI		テーマコード[*]（参考)
B43M 3/04		B43M 3/04		3F079
B07C 3/14		B07C 3/14		5B047
G06T 1/00		G06F 15/64	320J	

審査請求　未請求　請求項の数4　OL　（全6頁）

(54)【発明の名称】　画像認識用搬送装置及びこれを使用する封筒封入システム

(57)【要約】

【課題】本発明は、搬送体に付された識別符号を撮像して認識させる際に、搬送体を保持して搬送させる画像認識用搬送装置及び封筒封入システムに関し、簡易な機構で画像認識精度を向上させ、ひいては作業工程の稼働効率を向上させることを目的とする。

【解決手段】配置される撮像カメラ12の下方に2つの搬送ローラ13Aに環状に懸架された搬送ベルト14Aと、2つの搬送ローラ13Bに環状に懸架された搬送ベルト14Bとが配置された搬送手段により、搬送される搬送体16の識別符号が付された面が当接されるもので、その下方に配置された可動自在な可動保持部15－1，15－2で搬送体16の裏面を保持させる構成とする。
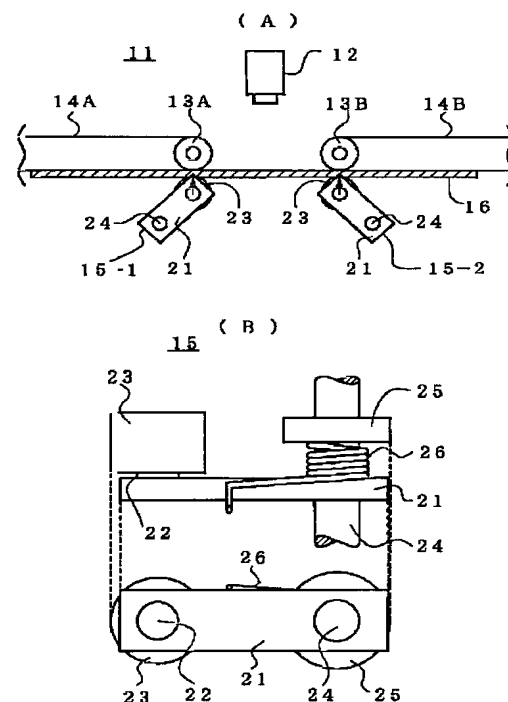
【特許請求の範囲】
【請求項1】所定の識別符号が付された搬送体を搬送
し、当該識別符号を撮像手段で撮像して認識させるため
の画像認識用搬送装置において、
前記撮像手段に対向する前記搬送体の前記識別符号が付
された面と当接して当該搬送体を搬送する搬送手段と、
前記搬送手段で搬送される搬送体における前記識別符号
が付された面の厚さ方向の反対面に対して可動自在に当
接して保持する所定数の保持手段と、
を有することを特徴とする画像認識用搬送装置。
【請求項2】請求項1記載の画像認識用搬送装置であっ
て、前記保持手段は、前記搬送体に対して厚さ方向に付
勢させる付勢手段を備えることを特徴とする画像認識用
搬送装置。
【請求項3】請求項1又は2記載の画像認識用搬送装置
を備える封筒封入システムであって、
前記識別符号が付された搬送体としての封筒に封入され
る所定数の封入物を供給する封入物供給手段と、
前記封筒に前記封入物供給手段より供給される前記封入
物を封入させる封入手段と、
前記封筒に付された識別符号を撮像する撮像手段と、
前記撮像手段からの撮像データに基づいて、前記封筒と
前記封入物との関連付けを確認し、管理する管理手段
と、
を有することを特徴とする封筒封入システム。
【請求項4】請求項3記載の封筒封入システムであっ
て、前記封筒に前記識別符号を付す識別符号形成手段を
備えることを特徴とする封筒封入システム。
【発明の詳細な説明】
【0001】
【発明の属する技術分野】本発明は、搬送体に付された
識別符号を撮像して認識させる際に、搬送体を保持して
搬送させる画像認識用搬送装置及び封筒封入システムに
関する。
【0002】
【従来の技術】近年、コンピュータを用いて画像認識処
理により文字、記号、物体、その他を認識させることが
工業、物流関係等盛んに行われている。これら画像認識
処理は、その目的に応じて種々の方式があるが、全般的
に認識精度の向上が望まれており、特に文字、記号等が
付された認識対象体に拘わらず認識精度が向上されるこ
とが望まれている。
【0003】図4に、従来の画像認識用搬送装置におけ
る画像認識の概念図を示す。図4（A）において、CC
Dを内蔵した撮像カメラ101が配置されており、その
下方に搬送機構の搬送ベルト102が配置される。一
方、画像認識対象のマークが付された搬送体103Aが
上記搬送ベルト102により搬送される。この搬送体1
03Aが搬送ベルト102上で搬送されて上記撮像カメ
ラ101の下方に位置したときに当該撮像カメラ101

が搬送体103Aに付されたマークを撮像する。撮像デ
ータは図示しない画像認識処理手段等で処理されて当該
マークが認識されるものである。
【0004】例えば、上記画像認識用搬送装置は、封筒
に所定の封入物を封入させて配送させる封筒封入システ
ムに適用されている。この場合、封筒には、各封筒毎に
異なる上記画像認識の対象のマークが印字され、又は当
該マークが印字されたシールが貼付されるもので、これ
らマークを画像認識させることにより識別符号と当該封
筒との関係を確認し、管理しようとするものである。
【0005】
【発明が解決しようとする課題】ところで、搬送体10
3Aによっては厚さが異なるものが対象となる場合があ
る。上記封筒に封入物を封入させる場合、その封入物の
内容や数量によって厚さが異なってくる。すなわち、図
4（A）に示す搬送体103Aの場合には当該搬送体1
03Aのマークが付された面（上面）から撮像カメラ1
01までの距離がH1であるのに対し、図4（B）に示
す厚さの異なる搬送体103Bの場合にはその上面から
撮像カメラ101までの距離がH2となる。
【0006】したがって、撮像カメラ101の位置が固
定されていると上記搬送体103Aと搬送体103Bと
ではピントが異なることになり、ピントが合わない状態
で撮像して画像認識させると、認識精度が低下するとい
う問題があると共に、誤認識によって一連の工程を停止
させる頻度が増して稼働効率が低下するという問題があ
る。また、何れの厚さの搬送体にも対処させようとする
場合、赤外線等を利用して、撮像カメラ101にオート
フォーカス機能を具備させたり、当該撮像カメラ101
の高さを調整させる機構を設けることが必要となり、高
価になると共に、機構が煩雑になるという問題がある。
【0007】そこで、本発明は上記課題に鑑みなされた
もので、簡易な機構で画像認識精度を向上させ、ひいて
は作業工程の稼働効率を向上させる画像認識用搬送装置
及び封筒封入システムを提供することを目的とする。
【0008】
【課題を解決するための手段】上記課題を解決するため
に、請求項1の発明では、所定の識別符号が付された搬
送体を搬送し、当該識別符号を撮像手段で撮像して認識
させるための画像認識用搬送装置において、前記撮像手
段に対向する前記搬送体の前記識別符号が付された面と
当接して当該搬送体を搬送する搬送手段と、前記搬送手
段で搬送される搬送体における前記識別符号が付された
面の厚さ方向の反対面に対して可動自在に当接して保持
する所定数の保持手段と、を有する構成とする。請求項
2の発明では、前記保持手段は、前記搬送体に対して厚
さ方向に付勢させる付勢手段を備える。
【0009】請求項3の発明では、請求項1又は2記載
の画像認識用搬送装置を備える封筒封入システムであっ
て、前記識別符号が付された搬送体としての封筒に封入

される所定数の封入物を供給する封入物供給手段と、前記封筒に前記封入物供給手段より供給される前記封入物を封入させる封入手段と、前記封筒に付された識別符号を撮像する撮像手段と、前記撮像手段からの撮像データに基づいて、前記封筒と前記封入物との関連付けを確認し、管理する管理手段と、を有する構成とする。請求項4の発明では、前記封筒に前記識別符号を付す識別符号形成手段を備える。

【００１０】このように、画像認識用搬送装置においては、識別符号が付された搬送体に対し、当該識別符号が付された面と当接して搬送手段が搬送し、搬送時に保持手段において当該識別符号が付された面の厚さ方向の反対面に当接して適宜付勢手段で可動自在に保持する。したがって、搬送体の厚さに拘わらず撮像手段までの撮像距離が一定となり、当該搬送体の厚さに応じてフォーカシングや距離調節をさせることなく簡易に当該識別符号の画像認識の精度を向上させることが可能となり、誤認識による稼働停止が防止されて稼働効率を向上させることが可能となる。

【００１１】また、上記画像認識用搬送装置を用いた封筒封入システムにおいては、識別符号が付された搬送体としての封筒に、封入物供給手段より供給される所定数の封入物を封入手段で封入させるもので、封入物に応じた厚さの当該封筒に適宜識別符号形成手段で付された識別符号を撮像手段が撮像して認識し、管理手段が識別符号と当該封筒との関連付けを確認し、管理する。したがって、封筒の厚さに拘わらず撮像手段までの撮像距離が一定となり、当該封筒の厚さに応じてフォーカシングや距離調節をさせることなく簡易に当該識別符号の画像認識の精度を向上させることが可能となり、誤認識による稼働停止が防止されてシステム稼働効率を向上させることが可能となる。

【００１２】
【発明の実施の形態】以下、本発明の好ましい実施形態を図により説明する。図１に、本発明の画像認識用搬送装置における搬送保持機構の構成図を示す。図１（Ａ）は本発明の画像認識用搬送装置における主要部分である搬送保持機構を示したものであり、図１（Ｂ）は保持手段を示したのもである。図１（Ａ）に示す搬送保持機構１１は、例えばＣＣＤを備える撮像カメラ１２が配置されるもので、当該撮像カメラ１２の下方に２つの搬送ローラ１３Ａ（図示しない対向する位置にも設けられる）に環状に懸架された搬送ベルト１４Ａと、２つの搬送ローラ１３Ｂ（図示しない対向する位置にも設けられる）に環状に懸架された搬送ベルト１４Ｂとが配置される。これら搬送ローラ１３Ａ，１３Ｂ、搬送ベルト１４Ａ，１４Ｂにより搬送手段を構成する。

【００１３】上記搬送手段の下方には、所定数の保持手段である可動保持部１５（１５－１，１５－２）が配置されるもので、当該搬送手段と可動保持部１５（１５－

１，１５－２）との間で所定の識別符号が付された搬送体１６Ａが搬送される。この場合、上記搬送手段の搬送ローラ１３Ａ，１３Ｂ、搬送ベルト１４Ａ，１４Ｂは、例えば搬送体１６Ａの幅方向（図面上、手前から奥方向）の幅（又はそれ以上の幅）で構成される。なお、当該搬送手段を搬送体１６Ａの幅方向に所望の個数で配置してもよい。また、上記可動保持部１５（１５－１，１５－２）は、例えば搬送体１６Ａの幅方向で図面上、手前側に２つ配置し、奥側に２つ配置されるものであるが、配置個数は適宜設定される。

【００１４】可動保持部１５（１５－１，１５－２）は、図１（Ｂ）に示すように、可動板２１の一端部分に軸２２が取り付けられ、当該軸２２に回転ローラ２３が回転自在に軸支されている。また、可動板２１の他端部分には回転軸２４が当該可動板２１と相対的に回転自在に軸支され、当該回転軸２４の所定部分にプーリ２５が固着される。そして、可動板２１とプーリ２５との間で回転軸２４に巻き付けるように付勢手段であるコイルバネ２６が設けられる。このコイルバネ２６の一端はプーリ２５に固定され、他端が可動板２１の側部に掛止される。

【００１５】このような可動保持部１５は、回転軸２４が装置筐体等に固定されるもので、当該回転軸２４を中心として可動板２１（回転ローラ２３）が回転自在となるもので、コイルバネ２６により回転ローラ２３は図１（Ａ）に示すように上方（搬送体１６Ａ側）に付勢力が働くものである。なお、撮像カメラ１２による撮像を行わない箇所での搬送は、上記搬送ベルト１４Ａ，１４Ｂのような搬送手段で当該搬送ベルト上に載置した状態で搬送させれば足りる。

【００１６】すなわち、搬送手段の搬送ローラ１３Ａ，１３Ｂ、搬送ベルト１４Ａ，１４Ｂは、撮像カメラ１２に対向する搬送体１６Ａの識別符号が付された面と当接して搬送体を搬送する。また、可動保持部１５（１５－１，１５－２）は、上記搬送手段で搬送される搬送体１６Ａにおける識別符号が付された面の厚さ方向の反対面に対して可動自在に付勢させる回転ローラ２３が当接して保持するものである。

【００１７】なお、上記構成では付勢手段としてコイルバネ２６を用いる場合を示したが、これに限るものではなく、板バネやゴム等の弾性部材を用いてもよい。また、上記構成は搬送体１６Ａを水平方向に搬送する場合を示したが、垂直方向に搬送させる場合には図１（Ａ）に示す各構成部分を９０度回転させたような配置をすればよいものである。

【００１８】そこで、図２に、図１の搬送保持機構の動作を説明するための図を示す。図２（Ａ）に示すように、搬送体１６Ａは、図示しない識別符号の付された面１６－１が搬送ベルト１４Ａ，１４Ｂに当接され、かつ可動保持部１５（１５－１，１５－２）で反対面１６－

2が当接されることで搬送ベルト１４Ａ，１４Ｂ側に付勢されながら保持されて搬送される。そして、撮像カメラ１２の下方に位置されたときに、当該撮像カメラ１２により付された識別符号が撮像される。このとき、識別符号が付された面１６－１と撮像カメラ１２との距離がＨＯで撮像される。

【００１９】一方、図２（Ｂ）に示すように、上記搬送体１６Ａより厚さの厚い搬送体１６Ｂが搬送される場合には、可動保持部１５（１５－１，１５－２）において当該搬送体１６Ｂの厚さに応じて可動板２１が回転軸２４を軸に厚さ方向に回転することで回転ローラ２３も当該搬送体１６Ｂの面１６－２に当接して搬送ベルト１４Ａ，１４Ｂ側に付勢しながら回動する。このとき、搬送体１６Ｂの識別符号が付された面１６－１の位置は搬送ベルト１４Ａ，１４Ｂで固定された状態であり、撮像カメラ１２の下方に位置されて撮像される場合の当該面１６－１と撮像カメラ１２との距離がＨＯとなる。

【００２０】すなわち、搬送体１６Ａ，１６Ｂの厚さに拘わらず識別符号が付された面１６－１は撮像カメラ１２に対して距離ＨＯが常に一定となる。これにより、撮像カメラ１２のピントを一定とした固定焦点として設定すれば常に安定した画像を撮像することができ、この撮像データに基づいて行う画像認識の精度が向上されるものである。このことは、画像（識別符号）の誤認識が減少して誤認識に伴う一連の工程の停止が防止されて稼働効率を向上させることができるものである。しかも、上記可動保持部１５（１５－１，１５－２）を設けるだけでよく、自動フォーカシングの機構や撮像カメラ１２の高さ調整の機構を設ける場合に比べ、安価かつ簡易に実現することができるものである。

【００２１】次に、図３に、本発明の画像認識用搬送装置が適用される封筒封入システムの概略図を示す。図３に示す封筒封入システム３１は、封筒に例えばチラシを封入して当該封筒に識別符号を付すものであり、所定数のチラシ３２を供給するチラシ供給部３３が配設され、チラシ３２及び後述の封筒を搬送する搬送装置３４及び封筒にチラシ３２を封入する封筒封入装置３５が配設される。封筒封入装置３５は封筒３６を供給する封筒供給部３７を備え、供給された封筒３６を封入位置に搬送する搬送手段（図示せず）を備える。また、封入時の厚みを検出する反射式等の厚みセンサ３８を備える。

【００２２】一方、封筒封入装置３５と搬送装置３４と間に予め印字等により識別符号が付されたラベル３９を貼付する識別符号形成手段としてのラベル貼付部４０が配設され、搬送装置３４の最終段階部分に上記搬送保持機構１１を備える画像認識用搬送装置（図に表れず）が配設されて上方に撮像手段である上記撮像カメラ１２が配置される。そして、チラシ３２が封入された封筒３６を順次ストックするスタッカ４１が配設される。また、４２は封筒封入工程を制御する管理手段である管理コン

ピュータ４２である。なお、ラベル貼付部４０に換えて、当該封筒３６に識別符号を直接、印刷印字する手段を設けてもよい。

【００２３】上記封筒封入装置３１は、チラシ供給部３３から所定数のチラシ３２が順次搬送装置３４に供給されこれらが重ね合わされて封入位置まで搬送される。一方、封筒封入装置３５では、封筒供給部３７から封筒３６を供給し、封入位置まで搬送する。この位置で所定数のチラシ３２が封入され、厚みセンサ３８で封入物が封入されたか否かが検出される。そして、所定数のチラシ３２が封入された封筒３６は封止されてラベル貼付部４０の位置まで搬送され、そこでラベル貼付部４０においてラベル３９が貼付されて反転される。

【００２４】ラベル３９が貼付された搬送体１６としての封筒３６は撮像カメラ１２の下方位置まで搬送されるが、当該位置の直前から画像認識用搬送装置の上記搬送保持機構１１で保持されて上記撮像カメラ１２の下方を、その貼付されたラベル３９を上向きにして通過する。このとき撮像カメラ１２で当該ラベル３９を撮像して識別符号（例えば番号）の撮像データを管理コンピュータ４２に送出し、当該管理コンピュータ４２により認識することで当該識別符号と当該封筒３６とが関連付けられるもので、この封筒３６における配送の管理等が行われる。そして、ラベル３９の撮像が行われた当該封筒３６（搬送体１６）はスタッカ４１に順次ストックされるものである。

【００２５】このように、上記封筒封入システム３１においては、封筒３６の厚さに拘わらず撮像カメラ１２までの撮像距離が一定となり、簡易に当該識別符号の画像認識の精度を向上させることができ、誤認識によるシステム稼働停止が防止されてシステム稼働効率を向上させることができるものである。

【００２６】なお、上記搬送保持機構１１を備える画像認識用搬送装置を図３に示すような封筒封入システムに適用した場合を示したが、およそ厚みが可変する搬送体１６上に付された識別符号を撮像カメラにより撮像して認識される総ての装置、システムに適用することができるもので、識別符号の画像認識精度を向上させ、稼働効率を向上させることができるものである。

【００２７】
【発明の効果】以上のように、請求項１及び２の発明によれば、識別符号が付された搬送体に対し、当該識別符号が付された面と当接して搬送手段が搬送し、搬送時に保持手段において当該識別符号が付された面の厚さ方向の反対面に当接して適宜付勢手段で可動自在に保持させることにより、搬送体の厚さに拘わらず撮像手段までの撮像距離が一定となり、簡易に当該識別符号の画像認識の精度を向上させることができ、稼働効率を向上させることができるものである。

【００２８】請求項３及び４の発明によれば、識別符号

が付された搬送体としての封筒に、封入物供給手段からの所定数の封入物を封入手段で封入させ、封入物に応じた厚さの当該封筒に適宜識別符号形成手段で付された識別符号を撮像手段が撮像して認識し、管理手段が識別符号と当該封筒との関連付けを確認し、管理することにより、封筒の厚さに拘わらず撮像手段までの撮像距離が一定となり、簡易に当該識別符号の画像認識の精度を向上させることができ、システム稼働効率を向上させることができるものである。

【図面の簡単な説明】

【図1】本発明の画像認識用搬送装置における搬送保持機構の構成図である。

【図2】図1の搬送保持機構の動作を説明するための図である。

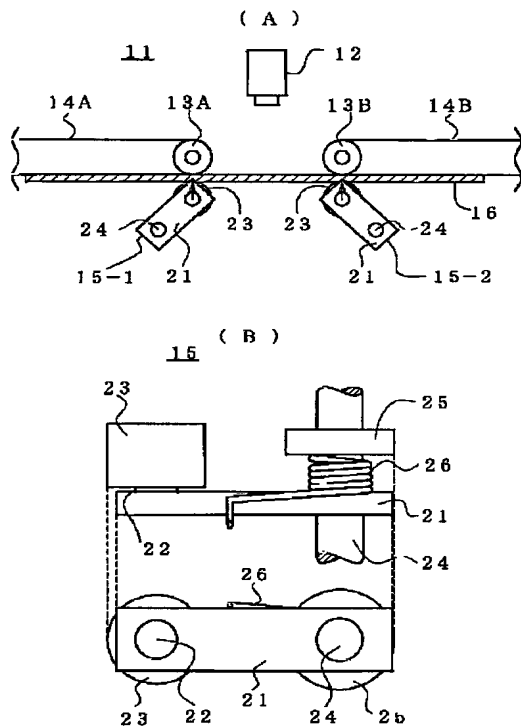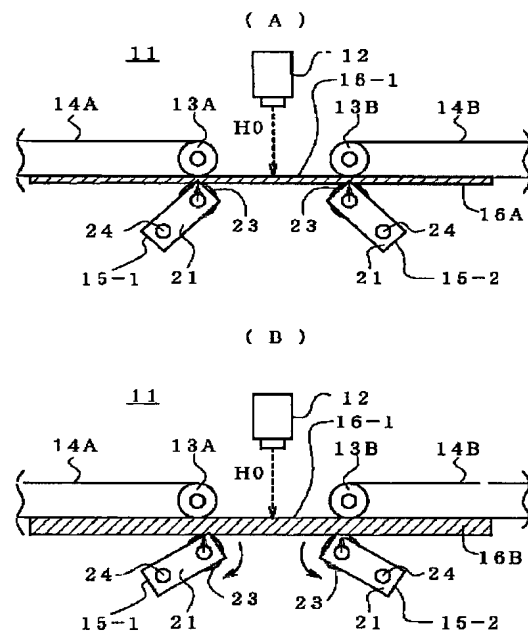【図3】本発明の画像認識用搬送装置が適用される封筒封入システムの概略図である。

【図4】従来の画像認識用搬送装置における画像認識の概念図である。

【符号の説明】

11	搬送保持機構
12	撮像カメラ
13A，13B	搬送ローラ
14A，14B	搬送ベルト
15（15-1，15-2）	可動保持部
16A，16B	搬送体
21	可動板
23	回転ローラ
26	コイルバネ
31	封筒封入システム
32	チラシ
36	封筒
39	ラベル
41	スタッカ

【図1】

（A）

（B）

【図2】

（A）

（B）

【図3】

【図4】

(A)

(B)